

CLAIMS

What is claimed is:

1. An analytic system for optical detection of a plurality of analytes that are bound to a biochip, the analytic system comprising:
a platform coupled to a confocal microscope detector and movable along an x-coordinate, a y-coordinate, and optionally a z-coordinate relative to the detector, wherein the platform is configured to receive a biochip;
wherein the biochip has a registration marker and further has a plurality of analytes in predetermined positions relative to the registration marker;
a first light source that illuminates the registration marker to generate a registration marker signal, and further comprising a second light source that illuminates at least one of the plurality of analytes to generate an analyte signal; and
wherein a focal position for detection of the analyte signal by the detector is determined by the analytic system using the registration marker signal.
2. The analytic system of claim 1 wherein the detector comprises an objective lens or an objective lens system with a numeric aperture that is sufficient to allow detection of the analyte signal without moving the platform along the z-coordinate.
3. The analytic system of claim 1 wherein the first light source has a wavelength maximum that is different from an absorption maximum of an optically detectable label of the at least one of the plurality of analytes.
4. The analytic system of claim 1 further comprising a third light source that illuminates the at least one of the plurality of analytes or another one of the plurality of analytes to generate a second analyte signal, and wherein the third light source has a wavelength maximum that is different from both, the wavelength maximum of the first light source and the absorption maximum of an optically detectable label of the at least one of the plurality of analytes or another one of the plurality of analytes.
5. The analytic system of claim 1 wherein the registration marker and the at least one of the analytes are illuminated at a different angle by the first and the second light source, respectively.
6. The analytic system of claim 1 wherein the first light source is a laser or a light emitting diode, and wherein the second light source is a laser.

7. The analytic system of claim 1 wherein the registration marker comprises a fluorescent dye, a luminescent compound, a phosphorescent compound, or a reflective compound.
8. The analytic system of claim 1 wherein the analyte signal is a fluorescence signal, a chemiluminescence signal, or a phosphorescence signal.
9. The analytic system of claim 1 wherein the detector comprises a photo-multiplier tube or a charge-coupled device.
10. The analytic system of claim 1 further comprising a second and a third registration marker, and wherein the focal position for detection of the analyte signal by the detector is determined by the analytic system using registration marker signals from the registration marker, the second registration marker and the third registration marker.
11. The analytic system of claim 1 wherein the analyte signal is normalized by the analytic system using a positive control marker on the biochip.
12. The analytic system of claim 1 further comprising a data transfer interface electronically coupled to the detector.
13. The analytic system of claim 12 wherein the data transfer interface provides data to a computer in a remote location.
14. An analytic system for micro-optical analysis of a biochip, the analytic system including a first light source and a second light source, wherein the first light source illuminates a registration marker on the biochip to provide a registration marker signal, wherein the second light source illuminates an analyte to provide an analyte signal, and wherein a focal position for detection of the analyte signal with a confocal microscope is determined using the registration marker signal.
15. The analytic system of claim 14 wherein the analyte signal has a round shape with a diameter of no more than 500 micrometer.
16. The analytic system of claim 15 wherein a test result is calculated from an average signal value of a portion of the round shape.

17. The analytic system of claim 14 further comprising a third light source illuminating the analyte to generate a second analyte signal.
18. An analytic system for optical analysis of a biochip, the analytic system comprising a first optical subsystem that uses a first light source that illuminates a registration marker on the biochip, and a first detector that detects a registration marker signal, and the system further comprising a second optical subsystem that uses a second light source that illuminates a probe or analyte on the biochip, and a second detector that detects a probe or analyte signal, wherein the first subsystem is used to determine a focal position for detection of the probe or analyte signal using the registration marker signal, and wherein the second subsystem is used to quantify the probe or analyte signal.
19. The analytic system of claim 18 wherein a platform receives the biochip, and wherein the biochip is moved into the focal position by moving the platform along an x-coordinate and a y-coordinate.
20. The analytic system of claim 19 wherein the biochip is moved into the focal position without moving the biochip along an z-coordinate.